CHAPTER 6 – MODE CHOICE

INTRODUCTION

Mode choice is the process of taking the zone-to-zone person trips by trip purpose from the trip distribution model, and determining how many of those person-trips are made by the various travel modes: non-motorized modes (walk and bike), auto modes (driver alone or carpool), and transit modes (drive or walk access and drive or walk egress).

The Year 2003 Regional Transportation Model incorporates a new set of calibrated and validated mode choice models for the Region. The model set was developed, calibrated, and validated based on the Year 2001 Southern California Origin-Destination Travel Survey, which was supplemented by transit on-board survey data.

This Chapter presents a description of the mode choice model, and presents summary statistics from its application in the Year 2003 Model Validation run. The various travel modes estimated by the model are also summarized and explained.

DESCRIPTION OF MODE CHOICE MODEL

There were a total of eight separate mode choice models applied during the development of the Year 2003 model. Each of the models is applied for both the peak and off-peak periods. The model structure and coefficients for each mode choice model are presented in the following sections.

Mode Choice Models and Market Segmentation

Separate models were developed for each trip purpose, including:

- Home based Work-Strategic (HBWS)
- Home based Work-Direct (HBWD)
- Home based College/University (HBU)
- Home based School (K-12) (HBSc)
- Home based Shop (HBSh)
- Home based Other (HBO) (includes Home based Social / Recreational)
- Work based Other (WBO)
- Other based Other (OBO)
- Home based Serve Passenger

The variable "Income" was used as the market segmentation variable for home based work trips in the mode choice model. The following income categories are the ones common among the various surveys used as the sources of data:

- Income Group 1 – (Less than $25,000 depending on the survey)
- Income Group 2 – ($25,000-$50,000 depending on the survey)
- Income Group 3 – ($50,000 and above)

One set of common variables and coefficients was developed for all income categories. A separate cost coefficient was estimated for each income group. Separate mode-specific constants were calibrated for each income level. Table 6-1 provides a summary of modes included in each category of mode choice models.

Table 6-1

YEAR 2003 MODE CHOICE MODEL TRAVEL MODES BY TRIP PURPOSE						
TRAVEL MODE CATEGORY	**MODE**	**HOME-BASED WORK**	**HOME-BASED SCHOOL**	**HOME-BASED NON-WORK**	**WORK-OTHER**	**OTHER-OTHER**
Auto Modes	Drive Alone	♦	♦	♦	♦	♦
	2 Person Carpool	♦	♦	♦	♦	♦
	3+ Person Carpool	♦	♦	♦	♦	♦
Transit Modes: Local Bus	Walk Access	♦	♦	♦	♦	♦
	Auto Access	♦				
Express Bus	Walk Access	♦				
	Auto Access	♦				
Urban Rail	Walk Access	♦				
	Auto Access	♦				
Commuter Rail	Walk/Auto Access	♦				
School Bus			♦			
Nonmotorized Modes	Walk trips	♦	♦	♦	♦	♦
	Bike trips	♦	♦	♦	♦	♦

Mode Choice Model Variables

The variables used in the model are:

- In-vehicle time (IVT) – all auto and transit modes, includes auto access time (minutes)
- HOV time saved – difference between HOV and SOV time for all shared ride modes (minutes)
- Distance - bike, walk (miles)
- Out-of-vehicle time (OVT) – all shared ride modes (minutes)
- Walk access time – all transit modes (minutes)
- Wait time – all transit modes (minutes)
- Transfer time – all transit modes (minutes)
- CBD dummy – 1 if trip is to CBD, 0 otherwise for all transit and shared ride modes
- Peak dummy – 1 if trip occurs during peak, 0 otherwise for all transit and shared ride modes
- Vehicles/Person Missing – 1 if trip record is missing the number of vehicles or persons in household, 0 otherwise for all modes (not used in application)
- Veh/Pers 0-0.5 – Ratio of vehicles to persons in household between 0 and 0.5 for all modes
- Veh/Pers 0.5-1 – Ratio of vehicles to persons in household between 0.5 and 1 for all modes
- Veh/Pers 1-1.5 – Ratio of vehicles to persons in household between 1 and 1.5 for all modes
- Veh/Pers >1.5 – Ratio of vehicles to persons in household greater than 1.5 for all modes
- Cost Missing Income – travel cost for all modes (dollars) times 1 if trip record is missing the income variable, 0 otherwise (not used in application)
- Cost Low Inc – travel cost for all modes (dollars) times 1 if household is low income, 0 otherwise
- Cost Med Inc – travel cost for all modes (dollars) times 1 if household is medium income, 0 otherwise
- Cost High Inc – travel cost for all modes (dollars) times 1 if household is high income, 0 otherwise

Model Estimation and Calibration

The initial round of model estimation was completed in July 2005. Several nesting structures were tested, but it was impossible to estimate reasonable model parameters, in terms of both coefficients of level of service variables and nesting coefficients. At that point, SCAG and Cambridge Systematics decided to use a pre-specified nesting structure. This nesting structure is shown in Figures 6.1 through 6.5. With this structure, it was still necessary to constrain many model parameters, including level of service variable coefficients and nesting coefficients. This constrained model was used in conjunction with a trip assignment process developed by SCAG to produce a new set of congested skims in August 2005. These skims were validated by SCAG and constituted the basis for the final

mode choice model estimation. Table 6.2 shows the constrained nested logit model estimation results, and Table 6-7 shows the comparison of mode shares between target value and model results for the year 2000.

MODE CHOICE RESULTS AND FINDINGS

Table 6-6 presents a comprehensive overview of mode choice modeling results for the Year 2003 Model Validation run, by county and for the modeling area as a whole. Table 6-3 shows results of the home-base work and university trips mode choice. Table 6-6 identifies the estimated number of vehicle trips, vehicle passengers, transit trips, non-motorized trips, and school bus trips made for all trip purposes. The results are tallied separately for peak period travel, off-peak period travel, and total daily travel. Estimated vehicle occupancy by county and by time period is also included in Table 6-6.

The mode choice model produced an estimated 452,101 daily home-work transit trips in the expanded model area. The remaining (non-transit vehicle) home-work trips were estimated at 9,196,505 vehicle trips and subdivided by vehicle occupancy as follows:

- 8,355,454 "drive alone" vehicle trips
- 665,111 two-person vehicle trips
- 175,939 vehicle trips carrying three or more persons

Total weekday transit ridership was 924,523. Daily vehicle trips totaled 35,828,231 resulting in an average vehicle occupancy of 1.39 persons per vehicle.

FIGURE 6-1

MODE CHOICE MODEL NESTING STRUCTURE
(HOME-BASED WORK DIRECT TRIPS)
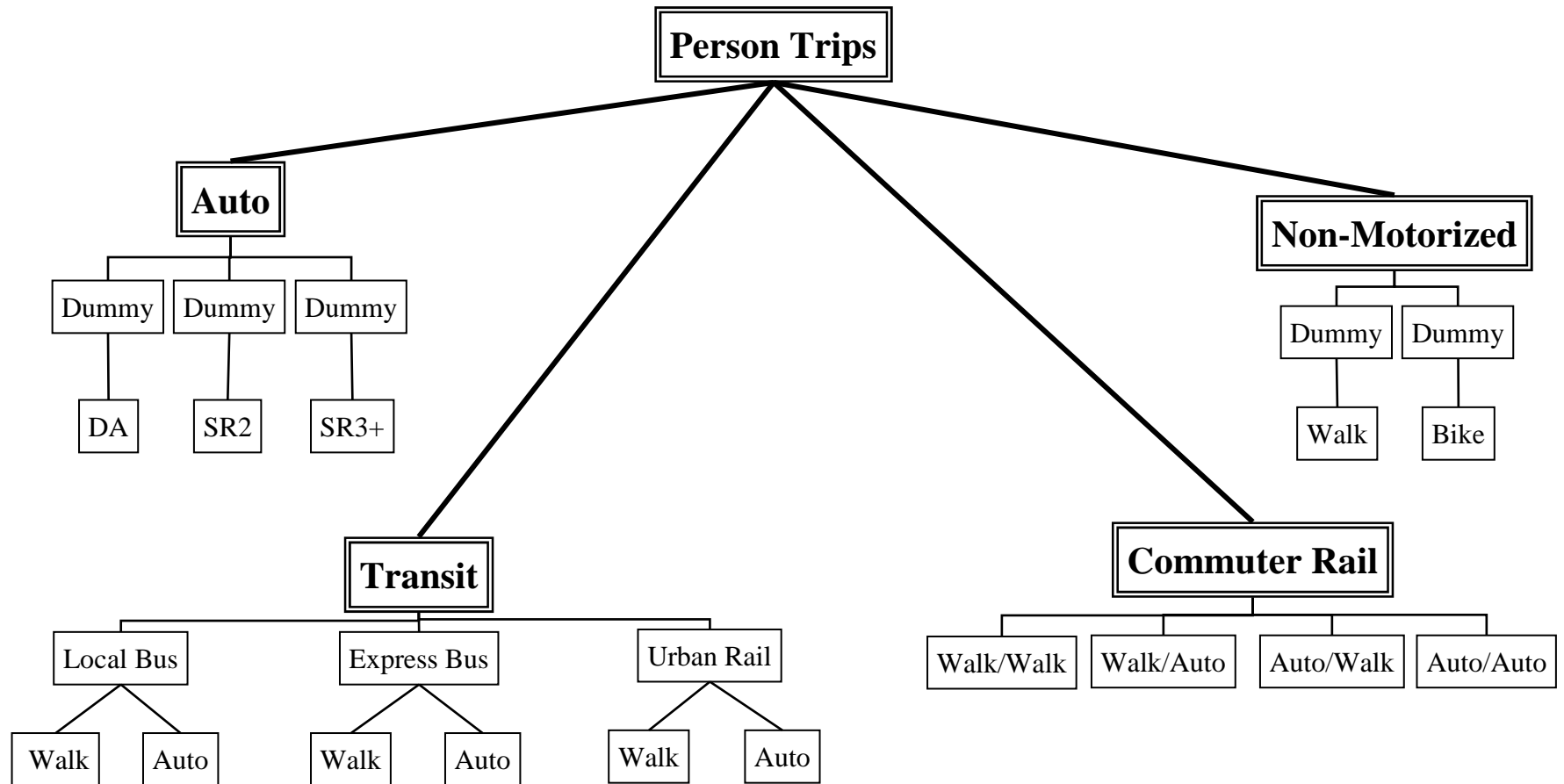
FIGURE 6-2

**MODE CHOICE MODEL NESTING STRUCTURE
(HOME-BASED WORK STRATEGIC TRIPS)**
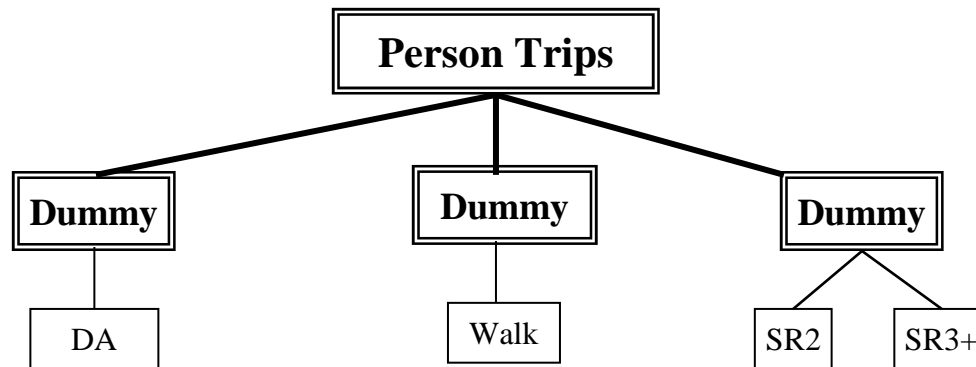
FIGURE 6-3

**MODE CHOICE MODEL NESTING STRUCTURE – MAIN MODEL
(HOME-BASED SCHOOL TRIPS)**
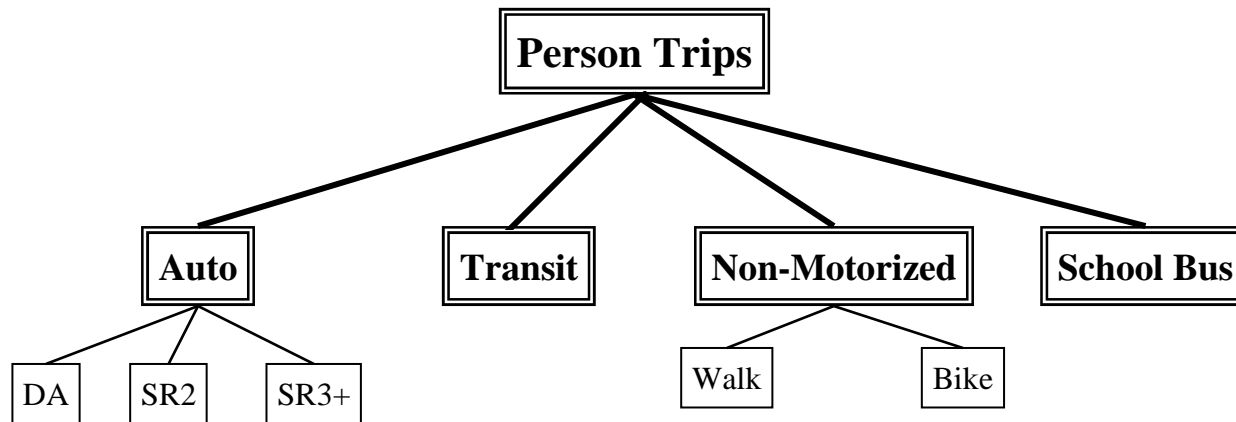
FIGURE 6-4

**MODE CHOICE MODEL NESTING STRUCTURE - MAIN MODEL
(HBO, HBSH, HBCU, OBO, AND WBO)**

```
                        Person Trips
           ┌─────────────────┼─────────────────┐
         Auto             Transit         Non-Motorized
      ┌────┼────┐                         ┌──────┴──────┐
     DA   SR2  SR3+                      Walk          Bike
```
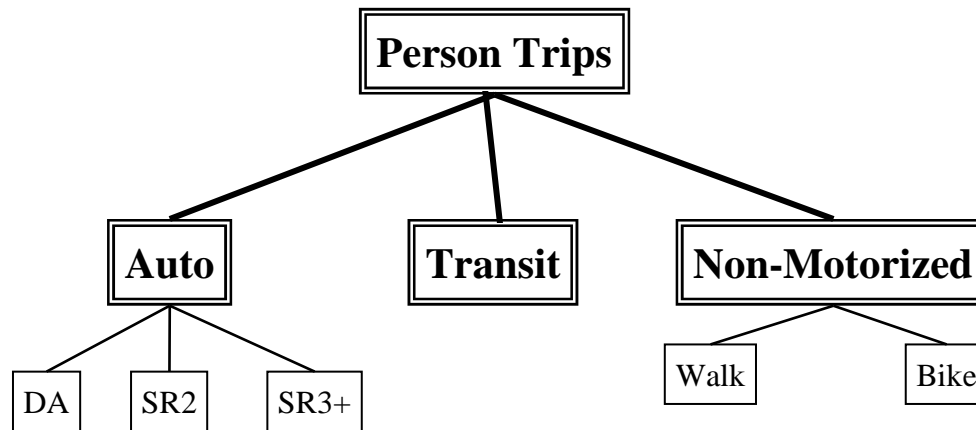
FIGURE 6-5

**MODE CHOICE MODEL NESTING STRUCTURE - TRANSIT SUBMODEL
(HBO, HBSH, HBCU, HBSC, OBO, AND WBO)**

Table 6-2

| Trip	HBWD		HBWS		HBU		HBSc		HBSh		HBO		WBO		OBO	
YEAR 2003 MODE CHOICE MODELS																
Purpose	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
IVT	-0.03	*	-0.03	*	-0.02	*	-0.02	*	-0.02	*	-0.02	*	-0.02	*	-0.02	*
HOV time sav	0.07	*	0.07	*	0.07	*	0.07	*	0.07	*	0.07	*	0.07	*	0.07	*
Distance (bike)	-0.252	-32.3			-0.293	-10.4	-0.173	-15.1	-0.094	-18.6	-0.089	-40.2	-0.163	-14.2	-0.093	-17.2
Distance (walk)	-0.251	-34.9	-0.145	-17.9	-0.255	-22.9	-0.171	-20.6	-0.099	-21.9	-0.093	-48.2	-0.164	-21.2	-0.094	-26.1
OVT (SR)	-0.09	*	-0.09	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*
Walk acc time	-0.09	*			-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*
Wait time	-0.09	*			-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*
Transfer time	-0.09	*			-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*	-0.06	*
CBD dummy			0.286	5.5			0.069	1.5								
Peak dummy (SR)	0.299	4.4	0.396	7.9	0.201	4	0.522	13.2	0.09	5.1	0.121	10.4			0.475	17.5
Peak dummy (tr)	0.299	4.4			0.201	4	1.161	1.3	0.09	5.1	0.121	10.4			0.816	1.8
Veh/Pers Missing	2.41	21.4			0.537	4.6			-0.491	-11.6	-0.94	-44.6				
Veh/Pers 0-0.5	0	Base		Base	0	Base	0	Base	0	Base	0	Base				
Veh/Pers 0.5- 1	-2.38	-35.6	-1.03	-20.5	-1.87	-16.1	0	Base	-0.777	-40.6	-0.8	-59.7				
Veh/Pers 1-1.5	-2.38	-35.6	-1.56	-16.8	-2.26	-10.2	-0.404	-2.7	-0.826	-21.4	-0.89	-34.3				
Veh/Pers > 1.5	-2.88	-16.2	-1.56	-16.8	-2.26	-10.2	-0.518	-2	-1.227	-25.8	-1.355	-44				
Cost Missing Inc	-0.0046	-13.5	-0.0033	-5.8												
Cost Low Inc	-0.009	*	-0.009	*												
Cost Med Inc	-0.0036	*	-0.0036	*												
Cost High Inc	-0.0014	*	-0.0014	*												
Cost					-0.0048	*	-0.0048	*	-0.0048	*	-0.0048	*	-0.0048	*	-0.0048	*
Nest Coeff 2	**0.6**	*														
Nest Coeff 1	**0.5**	*	**0.5**	*	**0.5**	*	**0.5**	*	**0.5**	*	**0.5**	*	**0.5**	*	**0.5**	*

Table 6-3

YEAR 2003 MODE CHOICE SUMMARY STATISTICS (HOME-BASED WORK)														
MODE CHOICE	**IMPERIAL**		**LOS ANGELES**		**ORANGE**		**RIVERSIDE**		**SAN BERNARDINO**		**VENTURA**		**TOTAL**	
Vehicle Trips	71,749	83.88%	5,050,489	79.24%	1,835,841	85.94%	853,652	84.33%	895,062	82.71%	489,713	87.46%	9,196,505	81.75%
Drive Alone	64,835	75.80%	4,552,609	71.43%	1,702,740	79.71%	774,784	76.54%	803,228	74.23%	457,257	81.67%	8,355,454	74.27%
2 Person Carpool	5,550	6.49%	398,205	6.25%	106,252	4.97%	60,433	5.97%	69,374	6.41%	25,297	4.52%	665,111	5.91%
3+ Person Carpool	1,363	1.59%	99,674	1.56%	26,848	1.26%	18,435	1.82%	22,459	2.08%	7,159	1.28%	175,939	1.56%
Auto Passenger Trips	8,868	10.37%	640,885	10.06%	171,533	8.03%	105,708	10.44%	124,672	11.52%	42,726	7.63%	1,094,391	9.73%
Vehicle Occupancy	1.12		1.13		1.09		1.12		1.14		1.09		1.12	
Transit Trips	212	0.25%	383,516	6.02%	38,945	1.82%	7,748	0.77%	17,279	1.60%	4,401	0.79%	452,101	4.02%
Non-Motorized Person Trips	4,708	5.50%	298,382	4.68%	89,925	4.21%	45,130	4.46%	45,135	4.17%	23,073	4.12%	506,352	4.50%
Total Person Trips	**85,537**	**100%**	**6,373,271**	**100%**	**2,136,243**	**100%**	**1,012,238**	**100%**	**1,082,147**	**100%**	**559,912**	**100%**	**11,249,349**	**100%**

Table 6-4

MODE CHOICE	IMPERIAL		LOS ANGELES		ORANGE		RIVERSIDE		SAN BERNARDINO		VENTURA		TOTAL	
YEAR 2003 MODE CHOICE SUMMARY STATISTICS (HOME-BASED NON-WORK)														
Vehicle Trips	121,703	47.83%	8,079,021	47.93%	2,557,977	51.03%	1,490,526	49.32%	1,560,674	48.38%	703,407	51.53%	14,513,308	48.81%
Drive Alone	65,211	25.63%	4,542,638	26.95%	1,595,336	31.83%	865,280	28.63%	882,092	27.35%	443,691	32.50%	8,394,249	28.23%
2 Person Carpool	35,163	13.82%	2,179,701	12.93%	586,126	11.69%	362,083	11.98%	396,243	12.28%	154,597	11.33%	3,713,912	12.49%
3+ Person Carpool	21,329	8.38%	1,356,682	8.05%	376,515	7.51%	263,162	8.71%	282,340	8.75%	105,118	7.70%	2,405,147	8.09%
Auto Passenger Trips	87,098	34.23%	5,508,625	32.68%	1,509,456	30.11%	1,008,246	33.36%	1,087,723	33.72%	412,110	30.19%	9,613,258	32.33%
Vehicle Occupancy	1.72		1.68		1.59		1.68		1.70		1.59		1.66	
Transit Trips	532	0.21%	273,067	1.62%	44,968	0.90%	10,158	0.34%	15,896	0.49%	6,141	0.45%	350,763	1.18%
School Bus	5,837	2.29%	322,173	1.91%	91,184	1.82%	62,411	2.07%	70,406	2.18%	25,961	1.90%	577,972	1.94%
Non-Motorized Person Trips	39,260	15.43%	2,671,241	15.85%	809,061	16.14%	450,727	14.91%	490,886	15.22%	217,383	15.93%	4,678,559	15.73%
Total Person Trips	**254,430**	**100%**	**16,854,127**	**100%**	**5,012,646**	**100%**	**3,022,069**	**100%**	**3,225,586**	**100%**	**1,365,002**	**100%**	**29,733,860**	**100%**

Table 6-5

YEAR 2003 MODE CHOICE SUMMARY STATISTICS (NON-HOME-BASED)													
MODE CHOICE	IMPERIAL		LOS ANGELES		ORANGE		RIVERSIDE		SAN BERNARDINO		VENTURA		TOTAL	
Vehicle Trips	66,877	60.25%	6,088,470	61.91%	2,122,394	62.90%	905,268	60.46%	948,319	61.65%	462,029	61.60%	10,593,357	61.93%
Drive Alone	49,269	44.39%	4,368,993	44.42%	1,519,762	45.04%	623,200	41.62%	647,780	42.11%	328,943	43.85%	7,537,948	44.07%
2 Person Carpool	11,971	10.78%	1,141,224	11.60%	399,831	11.85%	178,436	11.92%	189,352	12.31%	86,761	11.57%	2,007,575	11.74%
3+ Person Carpool	5,637	5.08%	578,254	5.88%	202,801	6.01%	103,632	6.92%	111,187	7.23%	46,324	6.18%	1,047,834	6.13%
Auto Passenger Trips	26,870	24.21%	2,669,148	27.14%	935,695	27.73%	452,235	30.20%	483,087	31.40%	209,152	27.88%	4,776,187	27.92%
Vehicle Occupancy	1.40		1.44		1.44		1.50		1.51		1.45		1.45	
Transit Trips	103	0.09%	92,335	0.94%	19,387	0.57%	3,276	0.22%	4,653	0.30%	1,905	0.25%	121,659	0.71%
Non-Motorized Person Trips	17,148	15.45%	985,004	10.02%	296,802	8.80%	136,601	9.12%	102,239	6.65%	76,991	10.26%	1,614,785	9.44%
Total Person Trips	**110,998**	**100%**	**9,834,957**	**100%**	**3,374,279**	**100%**	**1,497,380**	**100%**	**1,538,297**	**100%**	**750,077**	**100%**	**17,105,988**	**100%**

Table 6-6

YEAR 2003 MODE CHOICE SUMMARY STATISTICS (ALL TRIP PURPOSES)

PEAK PERIODS	IMPERIAL		LOS ANGELES		ORANGE		RIVERSIDE		SAN BERNARDINO		VENTURA		TOTAL	
Vehicle Trips	146,023	60.03%	10,523,860	59.97%	3,534,459	63.64%	1,782,244	60.86%	1,885,809	60.39%	905,476	63.73%	18,777,871	60.93%
Drive Alone	93,264	38.34%	6,955,935	39.64%	2,490,904	44.85%	1,157,080	39.51%	1,201,480	38.48%	637,141	44.85%	12,535,805	40.68%
2 Person Carpool	27,189	11.18%	1,877,372	10.70%	549,416	9.89%	309,024	10.55%	338,512	10.84%	136,494	9.61%	3,238,005	10.51%
3+ Person Carpool	25,570	10.51%	1,690,554	9.63%	494,139	8.90%	316,140	10.79%	345,817	11.07%	131,841	9.28%	3,004,061	9.75%
Auto Passenger Trips	57,525	23.65%	4,128,383	23.53%	1,229,355	22.14%	731,915	24.99%	795,335	25.47%	311,142	21.90%	7,253,656	23.54%
Vehicle Occupancy	1.39		1.39		1.35		1.41		1.42		1.34		1.39	
Transit Trips	480	0.20%	458,460	2.61%	64,282	1.16%	13,200	0.45%	25,140	0.81%	8,419	0.59%	569,980	1.85%
School Bus	4,037	1.66%	221,357	1.26%	62,893	1.13%	43,025	1.47%	48,629	1.56%	17,953	1.26%	397,892	1.29%
Non-Motorized Person Trips	35,180	14.46%	2,215,786	12.63%	662,672	11.93%	358,225	12.23%	367,728	11.78%	177,699	12.51%	3,817,291	12.39%
Total Person Trips	243,244	100%	17,547,846	100%	5,553,661	100%	2,928,609	100%	3,122,640	100%	1,420,690	100%	30,816,690	100%

OFF-PEAK PERIODS	IMPERIAL		LOS ANGELES		ORANGE		RIVERSIDE		SAN BERNARDINO		VENTURA		TOTAL	
Vehicle Trips	128,726	61.97%	9,557,991	61.61%	3,223,969	64.88%	1,627,708	62.53%	1,695,247	62.25%	816,719	65.11%	17,050,360	62.52%
Drive Alone	86,052	41.43%	6,508,305	41.95%	2,326,933	46.82%	1,106,184	42.50%	1,131,621	41.55%	592,751	47.26%	11,751,846	43.09%
2 Person Carpool	25,495	12.27%	1,841,759	11.87%	542,793	10.92%	291,928	11.21%	316,456	11.62%	130,162	10.38%	3,148,594	11.54%
3+ Person Carpool	17,179	8.27%	1,207,927	7.79%	354,242	7.13%	229,596	8.82%	247,170	9.08%	93,807	7.48%	2,149,921	7.88%
Auto Passenger Trips	50,891	24.50%	3,826,403	24.66%	1,145,113	23.04%	673,768	25.88%	723,145	26.55%	285,798	22.79%	6,705,118	24.59%
Vehicle Occupancy	1.40		1.40		1.36		1.41		1.43		1.35		1.39	
Transit Trips	367	0.18%	290,458	1.87%	39,018	0.79%	7,983	0.31%	12,689	0.47%	4,028	0.32%	354,543	1.30%
School Bus	1,800	0.87%	100,816	0.65%	28,291	0.57%	19,386	0.74%	21,777	0.80%	8,009	0.64%	180,079	0.66%
Non-Motorized Person Trips	25,936	12.49%	1,738,841	11.21%	533,116	10.73%	274,233	10.53%	270,531	9.93%	139,747	11.14%	2,982,405	10.94%
Total Person Trips	207,722	100%	15,514,510	100%	4,969,506	100%	2,603,078	100%	2,723,389	100%	1,254,301	100%	27,272,506	100%

ALL TIME PERIOD COMBINED	IMPERIAL		LOS ANGELES		ORANGE		RIVERSIDE		SAN BERNARDINO		VENTURA		TOTAL	
Vehicle Trips	274,749	60.92%	20,081,851	60.74%	6,758,428	64.22%	3,409,952	61.64%	3,581,055	61.26%	1,722,196	64.38%	35,828,231	61.68%
Drive Alone	179,316	39.76%	13,464,240	40.72%	4,817,838	45.78%	2,263,264	40.91%	2,333,101	39.91%	1,229,892	45.98%	24,287,650	41.81%
2 Person Carpool	52,684	11.68%	3,719,130	11.25%	1,092,209	10.38%	600,952	10.86%	654,968	11.20%	266,655	9.97%	6,386,599	10.99%
3+ Person Carpool	42,750	9.48%	2,898,481	8.77%	848,381	8.06%	545,736	9.87%	592,987	10.14%	225,648	8.44%	5,153,982	8.87%
Auto Passenger Trips	108,416	24.04%	7,954,786	24.06%	2,374,468	22.56%	1,405,683	25.41%	1,518,481	25.97%	596,940	22.32%	13,958,774	24.03%
Vehicle Occupancy	1.39		1.40		1.35		1.41		1.42		1.35		1.39	
Transit Trips	847	0.19%	748,918	2.27%	103,300	0.98%	21,183	0.38%	37,828	0.65%	12,447	0.47%	924,523	1.59%
School Bus	5,837	1.29%	322,173	0.97%	91,184	0.87%	62,411	1.13%	70,406	1.20%	25,961	0.97%	577,972	0.99%
Non-Motorized Person Trips	61,116	13.55%	3,954,628	11.96%	1,195,788	11.36%	632,458	11.43%	638,259	10.92%	317,447	11.87%	6,799,696	11.71%
Total Person Trips	450,965	100%	33,062,356	100%	10,523,168	100%	5,531,687	100%	5,846,030	100%	2,674,991	100%	58,089,196	100%

Table 6-7

## YEAR 2000 MODE CHOICE SUMMARY - MODEL VERSUS TRAVEL SURVEY

YEAR 2000 MODEL

Mode\Purpose	HBW	HBSH	HBSC	HBCU	HBO	WBO	OBO	TOTAL
Auto	78.44%	87.69%	51.59%	81.01%	87.13%	89.77%	90.54%	83.37%
DA	59.13%	39.16%	2.19%	59.19%	34.07%	73.86%	35.46%	39.74%
SR2	12.71%	24.87%	18.58%	14.09%	25.41%	9.96%	27.22%	21.66%
SR3	6.60%	23.65%	30.83%	7.73%	27.65%	5.95%	27.85%	21.97%
Transit	13.57%	1.10%	2.39%	6.79%	1.66%	0.59%	0.97%	3.81%
Mom-Mortorized	7.99%	11.21%	34.35%	12.20%	11.21%	9.64%	8.50%	11.83%
School Bus	0.00%	0.00%	11.67%	0.00%	0.00%	0.00%	0.00%	0.99%
TOTAL	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

YEAR 2001 SURVEY

Mode\Purpose	HBW	HBSH	HBSC	HBCU	HBO	WBO	OBO	TOTAL
Auto	79.99%	87.95%	51.86%	81.47%	87.28%	90.27%	89.71%	83.61%
DA	60.13%	39.16%	2.10%	59.40%	34.25%	73.16%	36.49%	40.18%
SR2	13.07%	24.97%	18.71%	14.23%	25.41%	10.53%	26.92%	21.71%
SR3	6.79%	23.81%	31.05%	7.84%	27.62%	6.58%	26.30%	21.71%
Transit	11.74%	0.78%	1.91%	6.27%	1.46%	0.44%	0.79%	3.27%
Mom-Mortorized	8.27%	11.28%	34.52%	12.27%	11.26%	9.28%	9.50%	12.13%
School Bus	0.00%	0.00%	11.71%	0.00%	0.00%	0.00%	0.00%	0.99%
TOTAL	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

FIGURE 6-6

HOME-BASED WORK TRIPS MODE SHARE COMPARISON

(2003 MODEL VS 2000 CENSUS)

Imperial County

Los Angeles County


Orange County

Riverside County

San Bernardino County

Ventura County

* Census 2000 Summary Files 3 (SF3), P.30